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Flocking

A Touch of Velour

Editor's note:

Flocked images have fallen in and out of vogue in screen printing, primarily due to the messy and cumbersome method of inexpensive application for direct flocking. But we continue to receive requests for information on the product, its possible applications, and its markets. While the bulk of the sophisticated technology has been imported from Europe and Japan, the flocking industry in the US is beginning to mature and grow. Since selective adhesive or binder (for adhesive powders) application for graphic flocking is done primarily by screen printing, it is appropriate that we look at this resurgent process, perhaps with a more creative, imaginative, and innovative eye. In this first of a two-part series, Brown Abrams explains the state of the art of flock technology.

Direct flock image

provided by

H. Wolf & Sons Inc.

(Cincinnati, OH)



Br wn Abrams
Fiberlok, Inc.

TRADITIONALLY, when you think of "flock," the first image that you have in mind is flocked wallpaper. If you then think of flocking as it relates to flocked graphics, the next image is usually flocked greeting cards (with loose fibers in the envelope). Finally, you think of the good old college sweatshirt with a large, fuzzy university logo flocked in a single color.

In any case, the original image of flocked products is that of brightly-colored—but cheap and not necessarily durable—finished products. Thanks to new technology, both in flocking and in chemistry, however, many flocked products on the market today are so durable that they are actually comparable to screen printed or embroidered items. Over the past several years, we have entered a new age of fiber graphic products. They are being developed, manufactured, sold, and bought by consumers in ever-increasing quantities as folks begin to realize and appreciate the improved product.

It has not been easy to change the attitude of the not-so-receptive market, which tends to think of flock as "cheap." But the new generation of flocked products can be so good that the products are often referred to as "velour" instead of flock. (Webster defines "velour" as "any of various fabrics with a pile or napped surface resembling velvet...")

WHAT is the great fascination with flocked products, anyway? Flock-decorated products have all the right stuff:

- **Brilliant appearance:** When you look at a flocked item, you see light that is reflected from the adhesive holding the fibers, actually through the translucent fibers themselves. The adhesive backing and the colored, translucent fibers work together to intensify the visual experience. You also see shading, as a result of the texture, and, depending on the type of finish on the fiber, you may also notice a "sheen" coming from the satin quality of the fiber finish.
- **Soft hand:** In today's market, frequently handled items that are smooth, shiny, plastic, cold, or rough are not considered as desirable as those that are soft, warm, silky, insulating, etc. This last group is considered more "natural."
- **Practical:** Flocked items absorb shock, moisture, and noise, while they tend to hide dirt (almost like carpet).
- **Opaque:** The thickness of a flock coating can offer total opacity in most applications.
- **Durable:** Properly applied, flocking will far outlast the articles to which it is applied. Flocking can be washable, dry-

cleanable, elastic, and tremendously abrasion-resistant. In Europe, an industry is producing flocked carpeting, a product that is now heading for the US.

Types of Velour Products

Within the general universe of flocked products, several basic, separate, and distinct categories exist.

The biggest area of the industry in terms of volume. It involves flocking either on a roll-to-roll basis, in sheets, or on three-dimensional items like window channels or glove compartments. Such major companies as West Point Pepperell use industrial flocking for manufacturing those slippery new lightweight blankets you see in hospitals and hotels. Another industry is built around the flocking of plastics like polystyrene, for use in making liners for jewelry and gift boxes. Additionally, rolls of flock with hot-melt or heat-seal adhesives are produced industrially for the die-cut lettering market.

May be thought of as either *direct*-flocked products, or *converted*-flocked products.

Direct-flocked products are usually produced by screen printers. The flocking is done in-house and offered as an alternative to traditional screen-printing inks or textures. It is an "optional" special effect, used primarily on garments such as bowling shirts and fleece goods. The use of this process is fairly widespread in single-color applications since the low-end technology requires little investment or experience. Naturally, high-volume garment printers tend to do more sophisticated

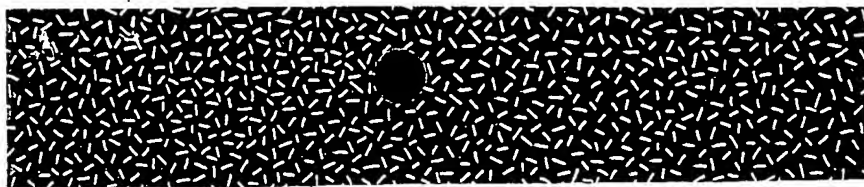


Direct flock image

provided by

H. Wolf & Sons Inc.

(Cincinnati, OH)



work, with a few "high-tech" firms involved in new automatic multicolor direct flocking processing.

Converted-flocked products are made from the industrially-produced flocked raw materials described earlier. This category includes flock transfers, die-cut flock iron-ons, and the new fusion-embossed flocking. Those companies that specialize in this type of manufacturing take flocked raw materials and convert them by subsequently screen printing, die cutting, laminating, and so forth. The distinction lies in the fact that these companies don't do the actual flocking or handling of the fibers.

Since the focus of this article is on flocked graphic products, I will not deal with industrial flocking here.

Direct-flocked products

The business of direct-flocked graphic items produced by screen printers has enjoyed steady growth for many years, and is primarily operated by screen printing and/or apparel manufacturing companies at two distinct levels.

The larger companies offering flocking on fleece garments for colleges, the NFL, and other licensed programs are major firms who have invested considerable time and money in developing their flocking departments. Except for high-voltage generators, much of the equipment is

developed in house by the user. In order to maintain an acceptable level of quality in the end product, it has often been necessary for the company to take expensive manufacturing steps. One such example is the installation of climate control equipment in the flocking areas of the shop in order to maintain the constant relative humidity that is required for consistently successful production.

These larger companies are primarily doing *electrostatic* flocking. In this process, the adhesive is screen printed onto the substrate and then the flock fibers are (1) electrically charged and dosed into the electric field, then (2) attracted to the adhesive and/or metal platen below. The velocity achieved by the electrical attraction forces the fibers into the adhesive, where they stick optimally at a 90° angle to the surface.

In contrast to electrostatic flocking, smaller shops tend to use the more common *beater-bar* or *gravity* type of flocking. This mechanical process simply doses the fibers onto the screen-printed adhesive and then distributes and arranges them by vibrating the substrate. Finished products using this process do

not usually have the durability or attractiveness of electrostatically flocked items because the fibers have not penetrated sufficiently into the adhesive layer. Also, the overall flock density is reduced because the individual fibers are not aligned at right angles to the surface as they enter the adhesive. The result is a less pleasing image with poorer "feel," since the flock is set at many random angles.

For smaller shops interested in high-quality flocking, hand-held electrostatic flocking instruments are available. The instrument is capable of producing a better finished product, but it is not practical for long runs. It is also not as controllable as the larger, fixed flocking equipment. Two companies (High Voltage Graphics, St Louis, MO, and Dekor Flocking Corporation, Middletown, NY) sell these small units for about \$500.

One of the main reasons why electrostatic flocking has been described as an imprecise business is that the results are directly and dramatically dependent on certain controllable variables. Paramount among these is the need to control the relative humidity in the environment where the flocking is done. Simply stated, we are talking about the electrical conductivity of the air. This electrical conductivity directly affects the electrical field, the velocity of the fibers as they are attracted to the ground (substrate), and the ultimate density of the finished product. If you are flocking at 70% RH and the humidity drops to 50% while all other variables are held constant, a noticeable change in the density of the flocked product will result. The best way to solve this problem is to install sophisticated humidity-control equipment; however, this equipment is expensive, requires planning, and often causes plant layout changes.



Flock transfer

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Polymark Corp.

(Cincinnati, OH)

There are other variables that need to be controlled as well: adhesive viscosity, conductivity of the fibers, curing of the adhesive, and final quality inspection. Generally speaking, direct-flocked graphics products from larger producers tend to show a higher level of quality, which reflects their investments in control procedures and equipment. You could say that controlling all the variables separates the men from the boys. It creates the natural contrasts that can be seen between large electrostatic flockers and small mechanical operations.

Converted-flocked products

As stated earlier, converted products tend to be produced by specialized companies as compared to the general screen-printing industry. A distinct advantage exists in being able to focus (by specializing) on production processes that requires different artwork preparation, chemicals, equipment and handling procedures than does conventional screen printing or direct flocking. It is also important to note that since the majority of the technology has been transplanted from overseas, there is a distinct shortage of support in the US from equipment manufacturers and raw material suppliers. Several product areas have been successful (listed here by degree of difficulty from easiest to most difficult).

Die-cut flock: Using die-cut flock involves simply cutting out designs from flock material that usually has a heat-seal (hot-melt or thermoplastic) adhesive on the back. In some cases, this type of heat-seal flock is also screen printed in order to reproduce multicolor designs. But the bulk of the business in the US (which is the lettering and numbering kits business) belongs to the large companies that specialize in this type of production. Due to their high volumes, they can achieve levels of efficiency that permit very low pricing. As a result, the market for this type of product is extremely price-sensitive.

Screen-printed, die-cut flock: Small screen-printing shops are able to work with this material successfully, and can even cut out individual personalized designs for customers.

Fusion-welded flock: Fusion-welded flock is flocked vinyl that is embossed, cut, and fused directly onto another material using specially prepared dies and heat. The process can utilize sonic energy, radio frequency energy, or thermal energy, depending upon application, and therefore tends to be a specialized type of manufacturing. When multicolor designs are required, the flocked vinyl is screen printed before the fusion-welding process.

Flock transfers: This market has proven over the years to require the advantage of specialization. It is also an example of problems that can result from lack of support from suppliers. Far fewer companies today produce flock transfers than did so five years ago. The reason is not that only a few companies possess the know-how to make the product. It is simply that only a few firms have been successful at developing the materials, machines, and production techniques to produce flock transfers consistently and profitably.

The market for flock transfers in the US is only a fraction of what it is in Europe, the Far East, or Australia. Two important factors have stunted this US growth: (1) indirect competition from other graphic processes, including puff inks and embroidery, and (2) unsuccessful attempts by screen printers to make flock transfers.

Marketing executives will confirm that one poor product affects the growth of the entire market, and flock transfers, as a group, have historically had processing problems.

Flock transfer

provided by

Fiberlok Inc.

(St. Louis, MO)



Flocking

One potential problem with flock transfers involves the actual heat-transferring operation. As with all transfer systems, there is difference between "transfer" and "adhesion." Without adequate heat, pressure, and dwell time the transfer may appear fine but the image may actually fall off the garment long before it is washed. In other improper applications, transfers were applied to substrates that were not recommended for use, such as nylon jackets or vinyl surfaces, causing additional transfer failures.

Good flock transfers rely on good flock paper, and successful companies produce flock paper on extremely expensive and sophisticated industrial flocking lines that allow them to control all the variables. The enormous expense of building such lines can generally only be justified by running many different types of flock products. For example, I have seen such equipment in Japan that was periodically switched over to produce floorcovering material. Other equipment in France has been changed over to produce flocked fabric for card tables. It has been estimated that, given the current level of American consumption, these established machines can produce an entire year's requirements in a few weeks.

Unfortunately, the market growth is slow, which tends to retard improved technology and education. More people used to be in the flock transfer business than are today. American Visions was liquidated. Union Ink Co. has stopped distributing flocked paper, although they still manufacture flock adhesive. And the list goes on to include Factors Etc., Holoubek, Quik Set, and Roach, to mention but a few.

There is nothing magic about flock transfers; they are simply different enough to require special attention to avoid costly mistakes. Even at Fiberlok, we admit that our loss rate because of rejects is relatively high, even after using state-of-the-art equipment, machines, materials, and technology.

There is a great deal that I have not covered. In Part 2 of this series, I will look at some of the new developments in flock transfers, their potential markets, and multicolor direct flock, an even more exciting and visually impressive product possibility. ■

